

STANDARD OPERATING PROCEDURE

TITLE: "B" BOOSTER STATION - K-33

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INTRODUCTION

The "B" booster is operated to overcome the pressure drop that occurs in the B-flow tie-line from K-902-1 to the lower section of the K-31 building.

Centrifugal compressors are used in the "B" booster station for their higher compression ratios of lower-range volume flow rates. An interruption in motor power will cause an automatic isolation of the station.

DESCRIPTION

The station consists of two size 92 centrifugal compressors driven by 500-hp motors. (Under normal operating conditions both compressors are in service.) Each pump is equipped with a seal feed, seal exhaust system, and lube oil supply. There is a common recycle line for both pumps.

Connected to the pump discharge manifold are eight intermediate surge drums, which, with the necessary manual/automatic controls, are used to store excess or supply make-up cascade inventory. The volume of this I.S. system is 16,000 scf; it is maintained at 140°F.

Gas Cooler

The gas recycle coolant system is not used and does not contain coolant; it is pressured with nitrogen to act as a buffer between the condenser water system and the UF₆ system. This allows a full flow of treated cooling water through the condenser thus protecting the tube bundle against excessive corrosion.

Flows and Instrumentation

UF₆ flow from K-902-1 B-stream divides, part goes through the "B" to "A" recycle valve K1B2 and CV 689 to supplement the A-stream from K-31, while the remainder goes through suction valve KBB1 and/or KBB2, compressor BB1 and/or BB2, and discharge valve KBB3 and/or KBB4.

The compressor discharge flow is distributed as follows: If the flow is in excess of the setting of PRX 1055, which records the B-flow to K-31 as measured by FE-731, CV 1031 will close the CV 1030 will open to permit the excess UF₆ to pass through valve KBB5 and CV 1030 into the I.S. drums while the remainder goes on through CV 1027 as the B-stream to lower K-31. If the flow is less than the setting of PRX 1055, CV 1030 will close and CV 1031 will open to permit make-up of the shortage by allowing flow from the I.S. drums through CV 1031 and valve KBB6 into the A-inlet line to K-33.

PRX 1055 is normally set by PIX 1042 located in the area control room, but also can be set by PIX 1057 and HBM 1058 at the "B" booster panel board by switching cock XX 1066 from area control room control to local control.

The I.S. drums may be isolated from the cascade by closing block valves KBB5 and KBB6. They must be isolated any time a cascade split between K-33 and

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lower K-31 is made, and left isolated until the cascade is remade. They can be isolated or tied in with the least amount of cascade disturbance if CV 1030 and CV 1031 are set at 50 divisions.

PROCEDURETo Remove Both Compressors From Operation

1. Notify the Central Control Room and K-31.
2. Stop all feeds and provide for excess inventory by allowing inventory to pass into K-31, by storing in I.S. drums or in the upper power control drums, or by raising K-33 pressures using the unit PLI's.
3. Set CV 1030 and CV 1031 on 50 divisions with PIX 1042 and close valves KBB5 and KBB6 simultaneously to isolate I.S. drums.
4. Have K-31 open the two top stage control valves on cascade below K-33.
5. Slowly close BB1 compressor suction valve KBB1.
6. Close BB1 compressor discharge valve KBB3 and shut down compressor.
7. K-31 must close the "A" splitter valve 3A233 manually if it fails to close automatically. Close BB2 compressor suction valve KBB2. This completes the cascade split.
8. Close BB2 compressor discharge valve KBB4 and shut down compressor.
9. Open the recycle valve of the bottom cell of the cascade in K-33 and switch stage control valves to manual.

To Remove One Compressor From Service When Both Are In Operation

1. Notify the Central Control Room and K-31.
2. Have K-31 place "A" splitter valve 3A233 on manual.
3. Set CV 1030 and CV 1031 on 50 divisions with PIX 1042 and close valves KBB5 and KBB6 simultaneously, isolating the I.S. drums.
4. Have K-31 open the two top stage control valves on cascade below K-33.
5. Close the suction valve, then discharge valve, of the compressor to be removed from service and shut down the compressor.
6. Set CV 1030 and CV 1031 on 50 divisions and open valves KBB5 and KBB6 simultaneously placing the I.S. drums on cascade. Reset PIX 1042 to maintain desired downflow.
7. Have K-31 return the "A" splitter valve 3A233 to automatic control.
8. The two top stage control valves on cascade below K-33 should remain open on manual control while on one-compressor operation.

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When One Or Both Compressors Are In Service And Trip

When the compressors trip out they isolate automatically, splitting the B-stream. Low B-flow actuates PBS 1063, which closes the "A" splitter valve 3A233, splitting the A-stream. The actuation of PBS 1063 also isolates the I.S. drums by closing CV 1030 and CV 1031 and block valves KBB5 and KBB6.

1. Notify the Central Control Room and K-31.
2. Immediately stop all feeds and raise high-side pressures in unit 1 to stop excess downflow of inventory.
3. Open recycle valve and switch stage control valves to manual on the bottom on-stream cell in K-33.
4. Determine cause for tripping, correct, and return compressor to service.

Placing Both Compressors In Service

1. Notify the Central Control Room and K-31.
2. Have K-31 place the "A" splitter valve 3A233 on manual control.
3. Check "B" to "A" recycle CV 689 for 29 division setting on automatic control.
4. Check CV 1027 for 89 division settings for normal operations.
5. Check seal feed and seal exhaust settings for normal operations.
6. Check oil supply to compressor and motor bearings.
7. Start BB2 compressor.
8. Open BB2 compressor discharge valve KBB4.
9. Have K-31 slowly open the "A" splitter valve 3A233.
10. When the motor load on stage 1 of the bottom cell in K-33 begins to rise above normal, close the cell recycle valve as needed and slowly open BB2 compressor suction valve KBB2.
11. Start BB1 compressor and open discharge valve KBB3.
12. Slowly open BB1 compressor suction valve KBB1.
13. Check with K-31 for normal operations and have "A" splitter valve 3A233 returned to automatic control and return top stage control valve below the split to normal.
14. Set CV 1030 and CV 1031 on 50 divisions with PIX 1042, and open valves KBB5 and KBB6 simultaneously, placing the I.S. drums back on cascade.

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Placing The Second Compressor In Service

1. Notify the Central Control Room and K-31.
2. Have K-31 place "A" splitter valve 3A233 on manual and return the two top stage control valves of the top cell below K-33 to normal.
3. Set CV 1030 and CV 1031 on 50 divisions with PIX 1042 and close valves KBB5 and KBB6 simultaneously to isolate the I.S. drums.
4. Start the compressor and open its discharge, then the suction valve.
5. Check with K-31 for normal operations and have "A" splitter valve 3A233 placed on automatic control.
6. Set CV 1030 and CV 1031 on 50 divisions and open valves KBB5 and KBB6 simultaneously placing the I.S. drums on cascade.

APPROVED:


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